

### **ABSTRACT**

The invention provides extraction columns for the purification of an analyte (e.g., a biological macromolecule, such as a peptide, protein or nucleic acid) from a sample solution, as well as methods for making and using such columns. The invention is characterized by the use of low dead volume columns, which is achieved in part by the use of low pore volume frits (e.g., membrane screens) to contain a bed of extraction media in the column. Low dead volume facilitates the elution of the captured analyte into a very small volume of desorption solution, allowing for the preparation of low volume samples containing relatively high concentrations of analyte.